DRAFT LETTER IN RESPONSE TO HURLOCKER EMAIL REGARDING SEDIMENT MANAGEMENT (2-14-03) W. Hines

Dear Sandy:

This letter is in response to your email of February 12, 2003 (attached) in which you raise questions regarding sediment management for the Buckman Diversion Project. More specifically, you are essentially asking why all the sediment diverted from the river cannot be pumped up the proposed conveyance line to the new water treatment plant (and Las Campanas).

CH2MHILL's 'conveyance' engineers who deal with design of pipelines and pump stations caution strongly against pumping sand >0.3 mm in size in high-head water delivery systems (a few say the cut-off should be at 0.1 mm). By high-head, is meant applications involving more than about 200' between lifts (pump stations)-- a few say no more than about 100'!

While it is possible to design a system for pumping all water and sediment together, the cost and operation of such a system would be daunting. To restrict lifts to no more than about 200' would probably mean three times the number of pump stations now proposed. Such a system would probably also require unusually low speed pumps with more stages, the elimination of intermediate tanks at each pump station and replacement with canned pumps and variable frequency drive motors (all very expensive), sophisticated control systems to coordinate pumping between the pump stations, and use of a carefully conducted flushing and line surging scheme (possibly even 'pigging')to resuspend and/or remove sediments that will deposit in the pipeline.

Note also that in the 'All-Pumping' option (Option 1 in the report), we felt that a two-pipe system (i.e., 2-20" pipes rather than 1-36" pipe) should be considered because of the problems associated with operating the larger line through a wide range of flows -- i.e., at lower flow rates, sediment will readily settle in the line and if not moved along within a few days could lead to essentially permanent deposits and biochemical corrosion at points of deposition. An All-Pumping system will transport much river organic matter, much of which is associated with the sediment load.

Our conclusion is that such a system is not a viable alternative from the standpoint of: O&M difficulties, pump wear, high energy and operational costs, and construction costs. There would also be high costs for trucking and disposal of sediments removed at intermediate blow off and/or flushing locations.

Obviously, the design of such a system has not been undertaken -- and perhaps there could be ways to make it work within the parameters of Project cost and other constraints -- but I doubt it. So far, the various sediment management options and their comparisons are based on conceptual design schemes only. A 25% design on several of the most promising options could answer your questions definitively.

Again, our conclusions regarding sediment management represent the professional judgements of CH2MHILL based on the information at hand. We welcome comments on the above and any of the issues raised in the Draft Report on Sediment Management Options for the Buckman project.

Yours truly,

Walter Hines, PE
Senior Engineer, CH2MHILL